gradation (no silt or clay, all material is derived from crushed rock) and has a specific abrasion resistance for the coarser aggregates (for the L.A. Abrasion Test the acceptable limit as measured by weight loss is less than 40%) designed to maximize packing density and produce a durable road surface. DSA requires careful handling to maintain uniform performance and there are also specific moisture, pH and placement (single lift placement with preferred method of application through a paver) requirements.

Several county maintenance and forestry road projects in Pennsylvania have been completed using DSA material and other road stabilization techniques outlined in the above referenced document. Some of the improvements noted for these projects included: a durable road surface with longer maintenance cycles (upwards of 3-4 years), a surface that can be plowed, produces very low amounts of airborne dust, considerably reduces fine sediments in storm water runoff that pollutes streams, does not require application of chemicals that impact the environment, can potentially be cost competitive with traditional materials. Material costs are approximately $8 per ton verses $6 per ton (not including hauling) for traditional gravel.

Information on DSA and the pilot projects was distributed to several branches within NCDOT for comments. Most agreed that the DSA sounded promising, but felt that further research would be needed before it could be recommended.

One of the major concerns raised was how the material would perform under higher traffic volumes. All of the roads in Pennsylvania's studies were forestry type roads or very isolated county roads that were done by local county maintenance crews and were not state maintained roads. No traffic volumes were mentioned in any of the studies. While PennDOT has approved of DSA for state purchasing, it has recently (February 2009) completed a state maintained project. This project is less than a mile long with a speed limit of less than 35 mph and traffic of 50 ADT. Therefore, data on how the DSA would perform with traffic in the range of 400 ADT, the projected traffic level of Needmore Road, is unavailable at this time. Other concerns for DSA are related to specific and meticulous maintenance operation requirements. Loosening DSA to sufficient depth during grading operations is very important to reestablish the proper blend of particle sizes and achieve maximum compaction density. Optimum moisture content is essential during DSA maintenance operations, since DSA dries out very quickly and is prone to separation under dry conditions. Finally to preserve the benefits of DSA, mixing of materials from drainage ditches with the surface material should be avoided.

Based on the information presented above, the Soil Binder/Alternative Surfacing Method for this project is not recommended.

Alternative B would marginally improve the quality of travel on Needmore Road and avoid impact to environmental resources. However, it would not meet the remaining elements of the project Purpose and Need.

C. Pave in Place – 18-feet Maximum Width Alternative

This alternative proposes to improve Needmore Road to a 2-lane paved facility consisting of a maximum 9-foot wide travel lane in each direction, with a maximum roadway width of 18 feet. This alternative will essentially pave the existing roadway width in place. However, in Section C of the project, the existing roadway widths are as narrow as 14 feet in some areas and the roadway is directly adjacent to existing acidic rock on one side and the Little Tennessee River on the opposite side.